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Rethinking Air Defence

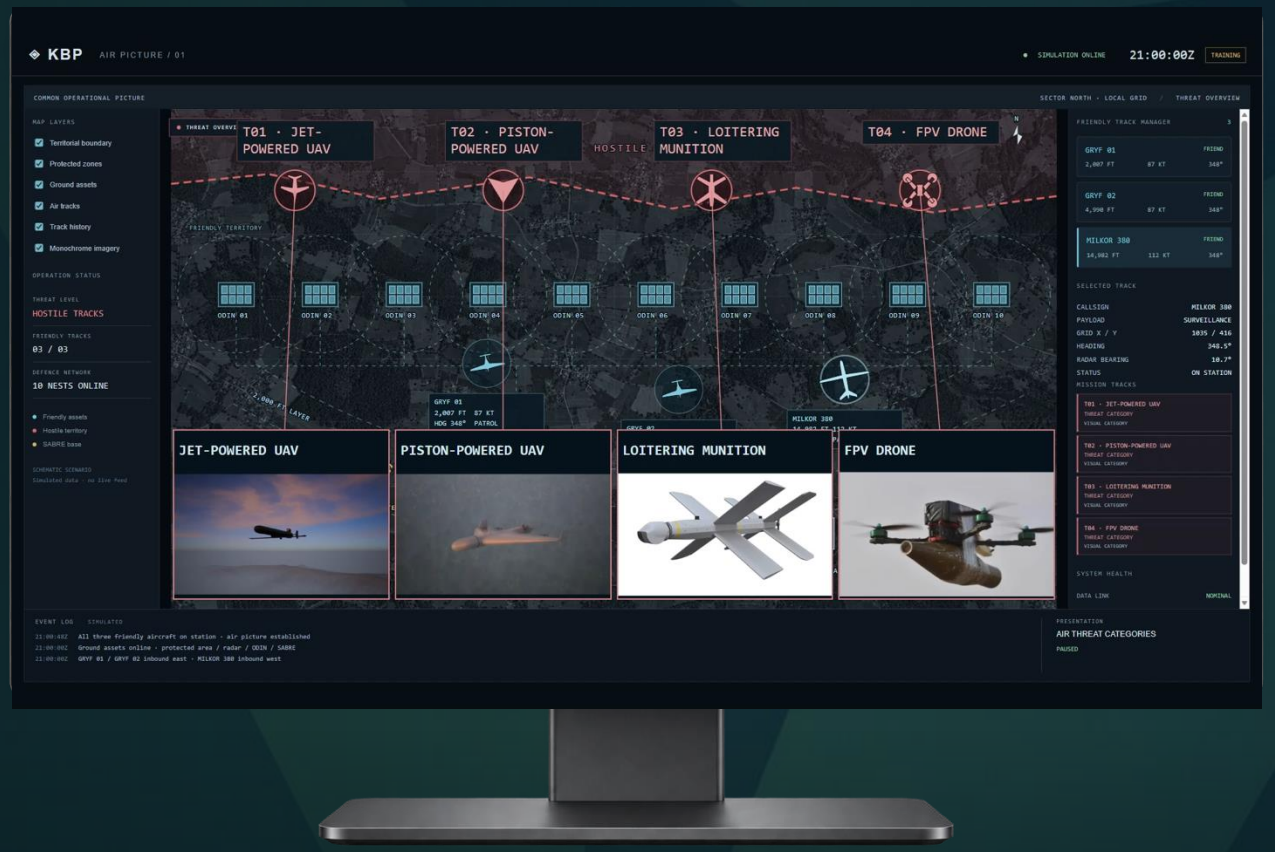
A Cost-Effective Approach to UAV Threats

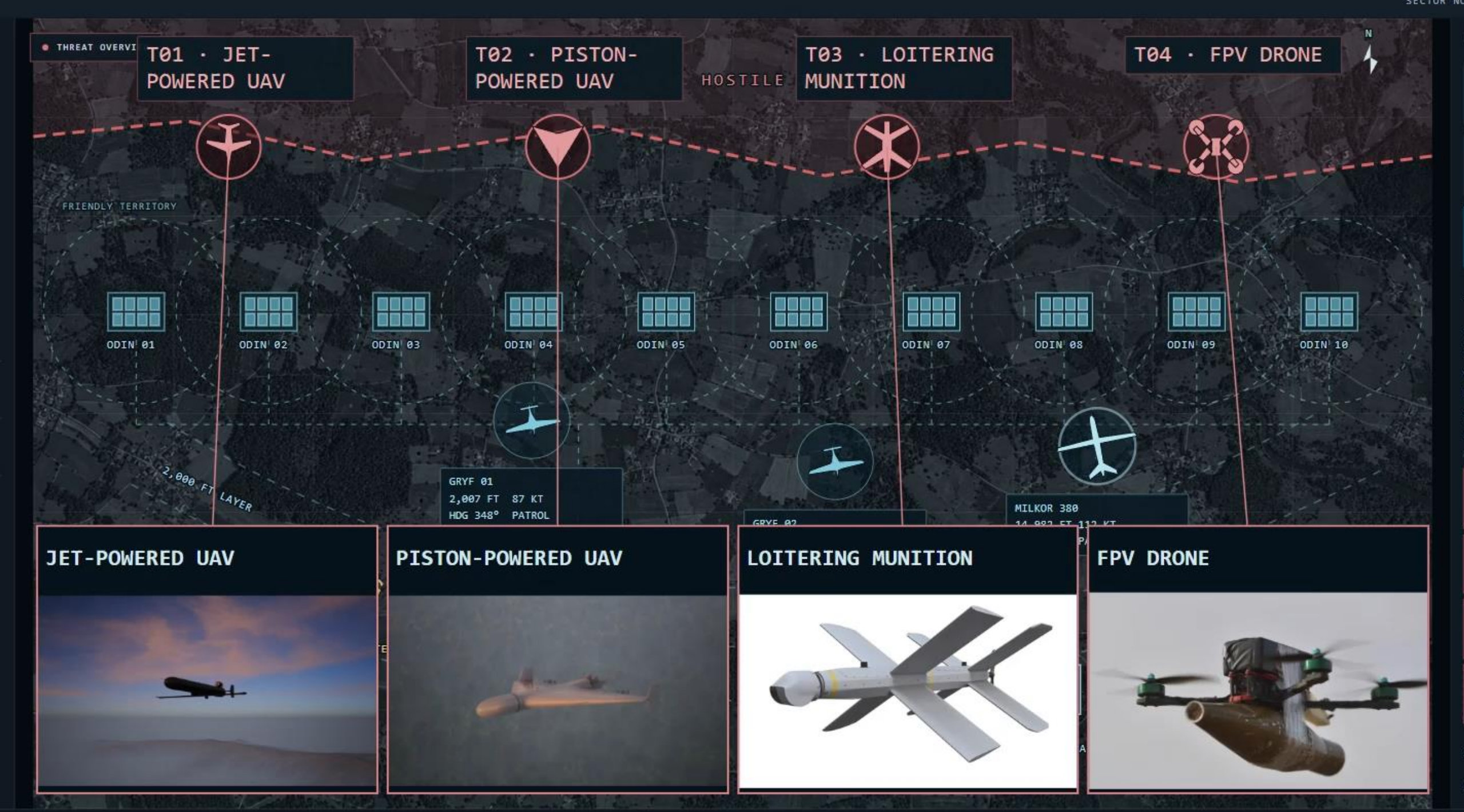


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The Changing Air Threat

- **Evolving UAV Threats**
  Long-range piston-powered drones and faster jet-powered UAVs
- **Cost Imbalance**
  ~$35,000 Shahed-type drone vs. several million dollars for a Patriot PAC-3 interceptor
- **Sustainable Air Defence**
  Interceptor stockpiles, replenishment and production capacity




THREAT OVERVI
T01 · JET-POWERED UAV
T02 · PISTON-POWERED UAV
HOSTILE
T03 · LOITERING MUNITION
T04 · FPV DRONE
N
FRIENDLY TERRITORY
ODIN 01
ODIN 02
ODIN 03
ODIN 04
ODIN 05
ODIN 06
ODIN 07
ODIN 08
ODIN 09
ODIN 10
2,000 FT LAYER
GRYF 01
2,007 FT 87 KT
HDG 348° PATROL
MILKOR 380
JET-POWERED UAV
PISTON-POWERED UAV
LOITERING MUNITION
FPV DRONE

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A New Approach to Air Defence



- Protect military and civilian infrastructure beyond the frontline
- Build tailored point defence around critical assets
- Address FPV drones, sabotage and attacks in the rear
- Combine AI-assisted assessment with human judgement
- Maintain human oversight and safe airspace coordination

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Different Threats, Different Responses



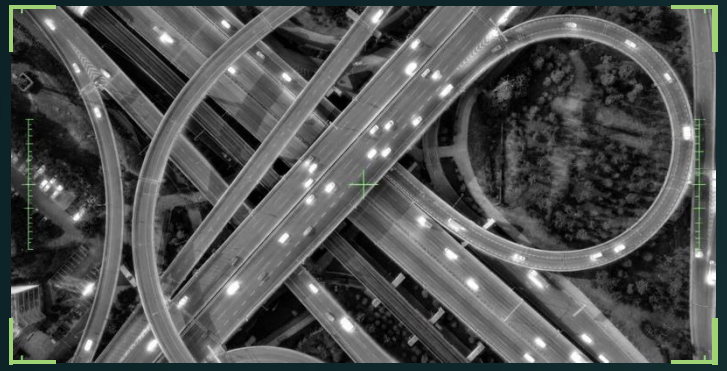
MILITARY BASES



POWER PLANTS



BRIDGES



TRANSPORT NETWORKS



LOGISTICS CENTRES

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Three Priorities for Sustainable Air Defence

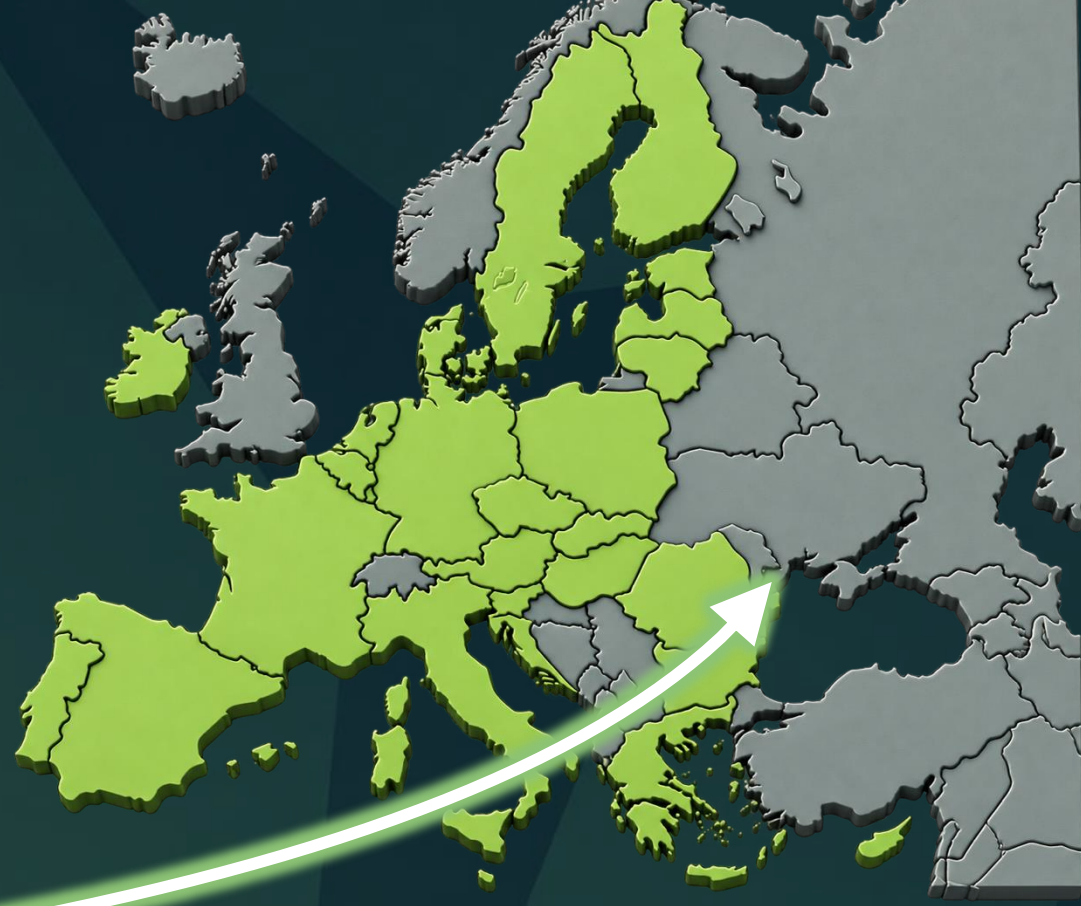
- Cost Efficiency
- Production Capacity
- European Industrial Capability



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Scaling European Defence Production

- Scale production
- Replenish stocks
- Secure long-term supply





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The Value of Integrated Air Defence

- Connect high, medium, low and ground-level capabilities
- Integrate sensors and effectors across all layers
- Share a common operational picture in real time
- Coordinate responses through command and control
- Replace isolated systems with one connected ecosystem



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Integrated Air Defence

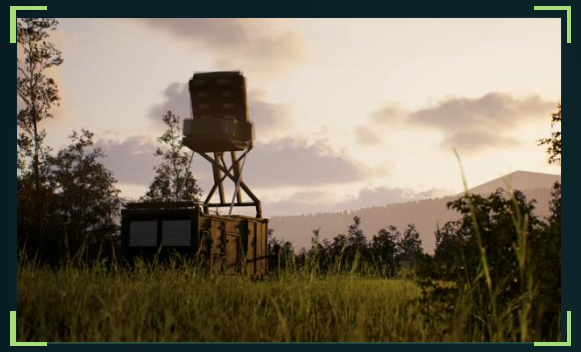
NATO / National Air C2



Standardised interfaces and interoperability

COMMAND & CONTROL

SENSORS



Detect & track



Assess & coordinate

EFFECTORS



Air defence

(Additional interceptor layers)

Multiple layers. One coordinated system.

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An Example of a Layered Defence Ecosystem



- Persistent airborne surveillance and early warning
- Airborne carriers extend coverage and deploy interceptors
- Ground launch units protect critical infrastructure
- Electronic warfare adds complementary protection
- Integrate every element with higher-level defence systems

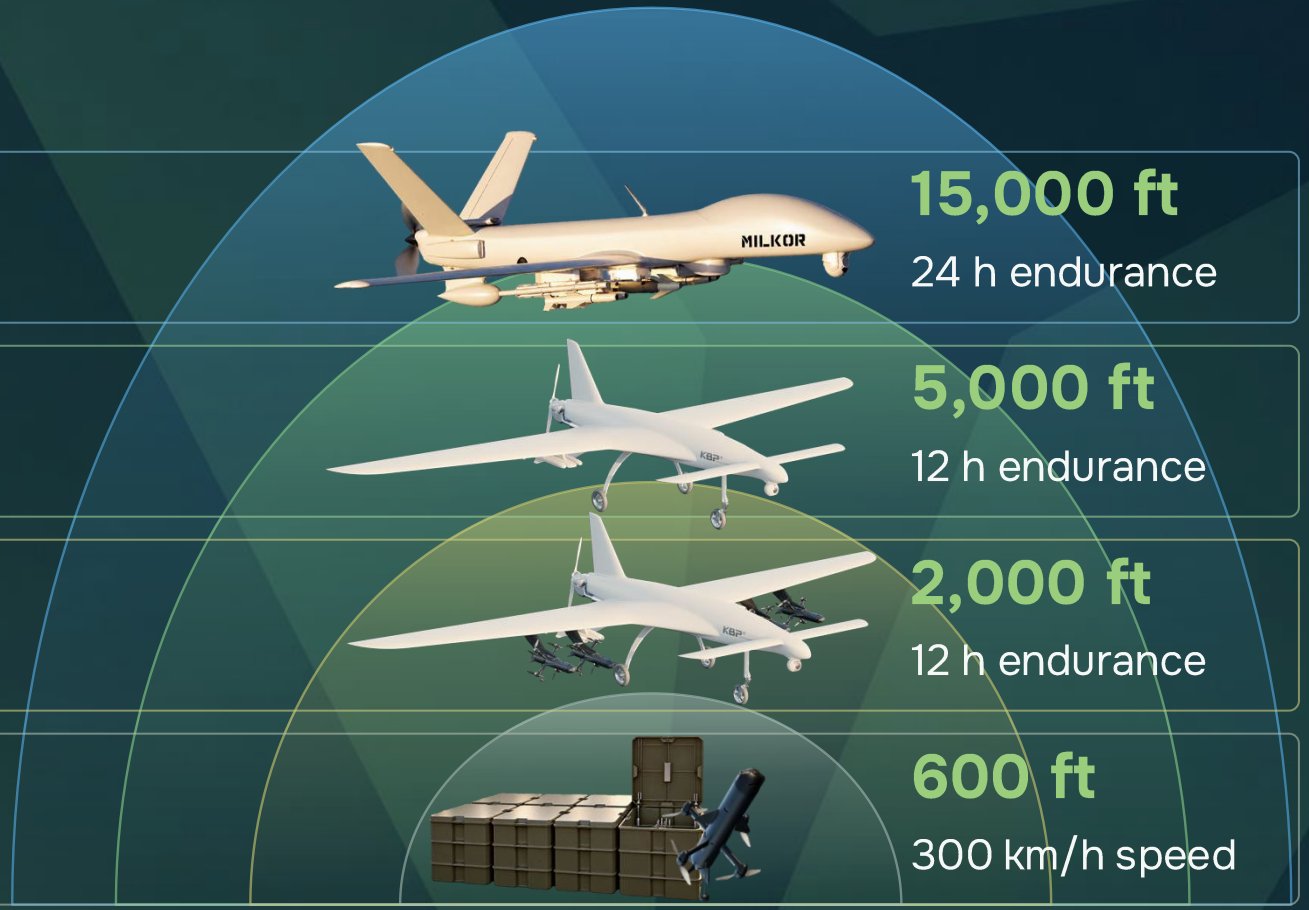



LAYER 04
MILKOR 380
AIR-TO-AIR MISSILES
ALT 15 000 ft
LAYER 03
GRYF 2
INTERCEPTOR MISSILES
ALT 5 000 ft
LAYER 02
GRYF 1
ODIN AIR-TO-AIR
ALT 2 000 ft
LAYER 01
ODIN
ODIN GROUND-TO-AIR
ALT 600 ft

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Air Defence Layers

4 LAYER	**MILKOR 380** Surveillance and air-to-air missiles	**15,000 ft** 24 h endurance
3 LAYER	**GRYF / MISSILES** Interceptor missiles	**5,000 ft** 12 h endurance
2 LAYER	**GRYF / ODIN** ODIN air-to-air	**2,000 ft** 12 h endurance
1 LAYER	**ODIN** ODIN ground-to-air	**600 ft** 300 km/h speed




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COMMON OPERATIONAL PICTURE

SECTOR NORTH · LOCAL GRID / AREA OVERVIEW

MAP LAYERS

- [x] Territorial boundary
- [x] Protected zones
- [x] Ground assets
- [x] Air tracks
- [x] Track history
- [x] Monochrome imagery

OPERATION STATUS

THREAT LEVEL
NO THREATS

FRIENDLY TRACKS
00 / 03

DEFENCE NETWORK
00 / 10 NESTS

- Friendly assets
- Hostile territory
- SABRE base

SCHEMATIC SCENARIO
Simulated data · no live feed



FRIENDLY TRACK MANAGER 0

GRYF 01		PENDING
–	–	–
GRYF 02		PENDING
–	–	–
MILKOR 380		PENDING
–	–	–

SELECTED TRACK

CALLSIGN	MILKOR 380
PAYLOAD	SURVEILLANCE
GRID X / Y	–
HEADING	–
RADAR BEARING	–
STATUS	AWAITING ENTRY

SYSTEM HEALTH

DATA LINK	NOMINAL
RADAR	ONLINE
TIME SYNC	LOCKED

EVENT LOG SIMULATED

20:59:51Z ODIN nest positions displayed
20:59:49Z Mobile radar position displayed
20:59:47Z Protected area displayed

PRESENTATION
ODIN CONTROL NETWORK
PAUSED


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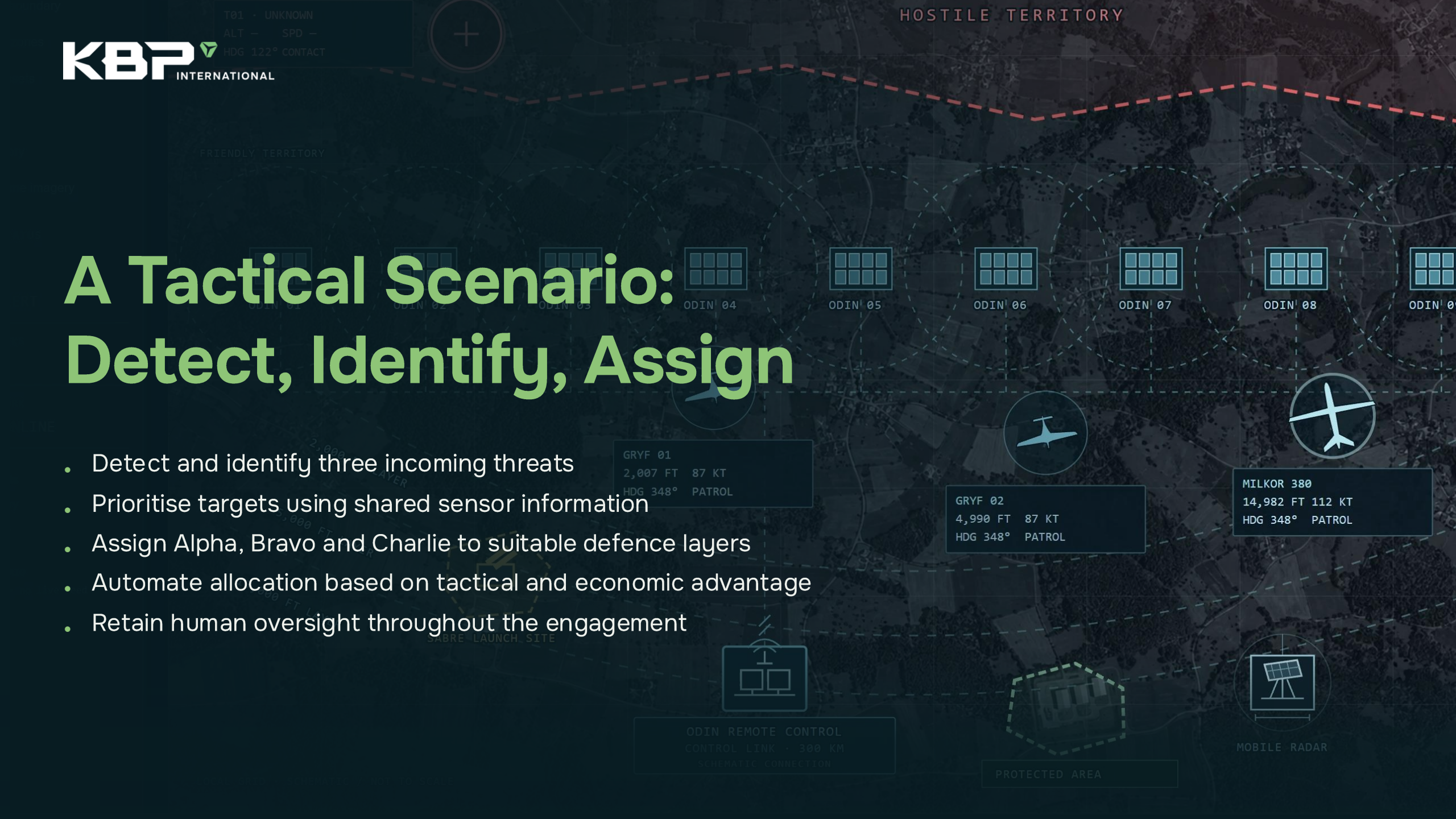

KBP
KBP INTERNATIONAL


KBP INTERNATIONAL
MILKOR

KBP INTERNATIONAL

A Tactical Scenario: Detect, Identify, Assign

- Detect and identify three incoming threats
- Prioritise targets using shared sensor information
- Assign Alpha, Bravo and Charlie to suitable defence layers
- Automate allocation based on tactical and economic advantage
- Retain human oversight throughout the engagement



COMMON OPERATIONAL PICTURE · SECTOR NORTH · LOCAL GRID / THREAT DETECTED

MAP LAYERS

- [x] Territorial boundary
- [x] Protected zones
- [x] Ground assets
- [x] Air tracks
- [x] Track history
- [x] Monochrome imagery

OPERATION STATUS

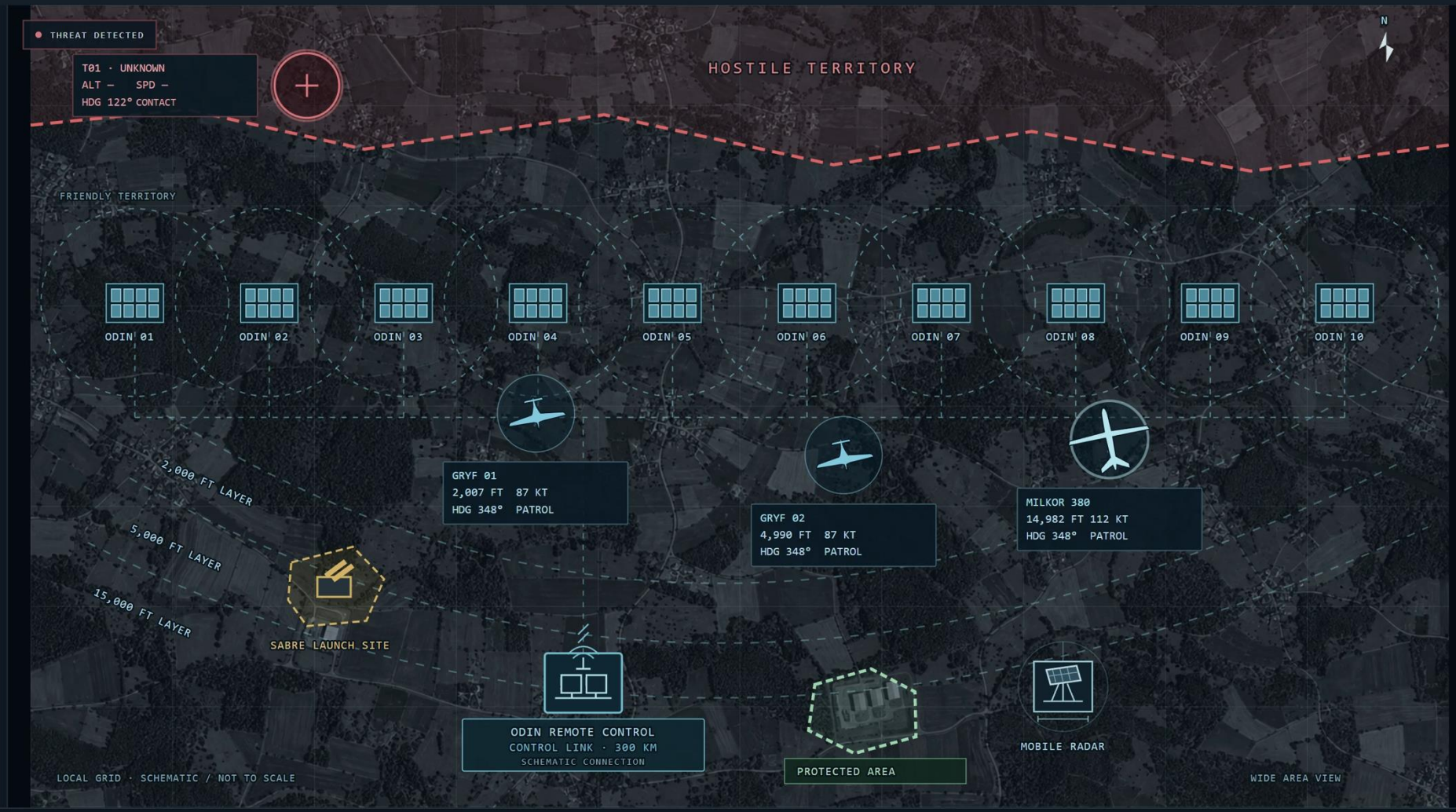
THREAT LEVEL
CONTACT ALERT

FRIENDLY TRACKS
03 / 03

DEFENCE NETWORK
10 NESTS ONLINE

- Friendly assets
- Hostile territory
- SABRE base

SCHEMATIC SCENARIO
Simulated data · no live feed



FRIENDLY TRACK MANAGER 3

GRYF 01	FRIEND		
2,007 FT	87 KT	348°	
GRYF 02	FRIEND		
4,990 FT	87 KT	348°	
MILKOR 380	FRIEND		
14,982 FT	112 KT	348°	

SELECTED TRACK

CALLSIGN	MILKOR 380
PAYLOAD	SURVEILLANCE
GRID X / Y	1035 / 416
HEADING	348.5°
RADAR BEARING	10.7°
STATUS	ON STATION

MISSION TRACKS

T01 · UNKNOWN CONTACT
UNCLASSIFIED
CLASSIFICATION PENDING

SYSTEM HEALTH

DATA LINK	NOMINAL
RADAR	ONLINE
TIME SYNC	LOCKED

EVENT LOG SIMULATED

21:00:48Z All three friendly aircraft on station · air picture established
21:00:00Z Ground assets online · protected area / radar / ODIN / SABRE
21:00:00Z GRYF 01 / GRYF 02 inbound east · MILKOR 380 inbound west

SCENARIO 03 / 16
Threat detected
PAUSED

COMMON OPERATIONAL PICTURE

SECTOR NORTH · LOCAL GRID / HOSTILE TRACKS IDENTIFIED

MAP LAYERS

- [x] Territorial boundary
- [x] Protected zones
- [x] Ground assets
- [x] Air tracks
- [x] Track history
- [x] Monochrome imagery

OPERATION STATUS

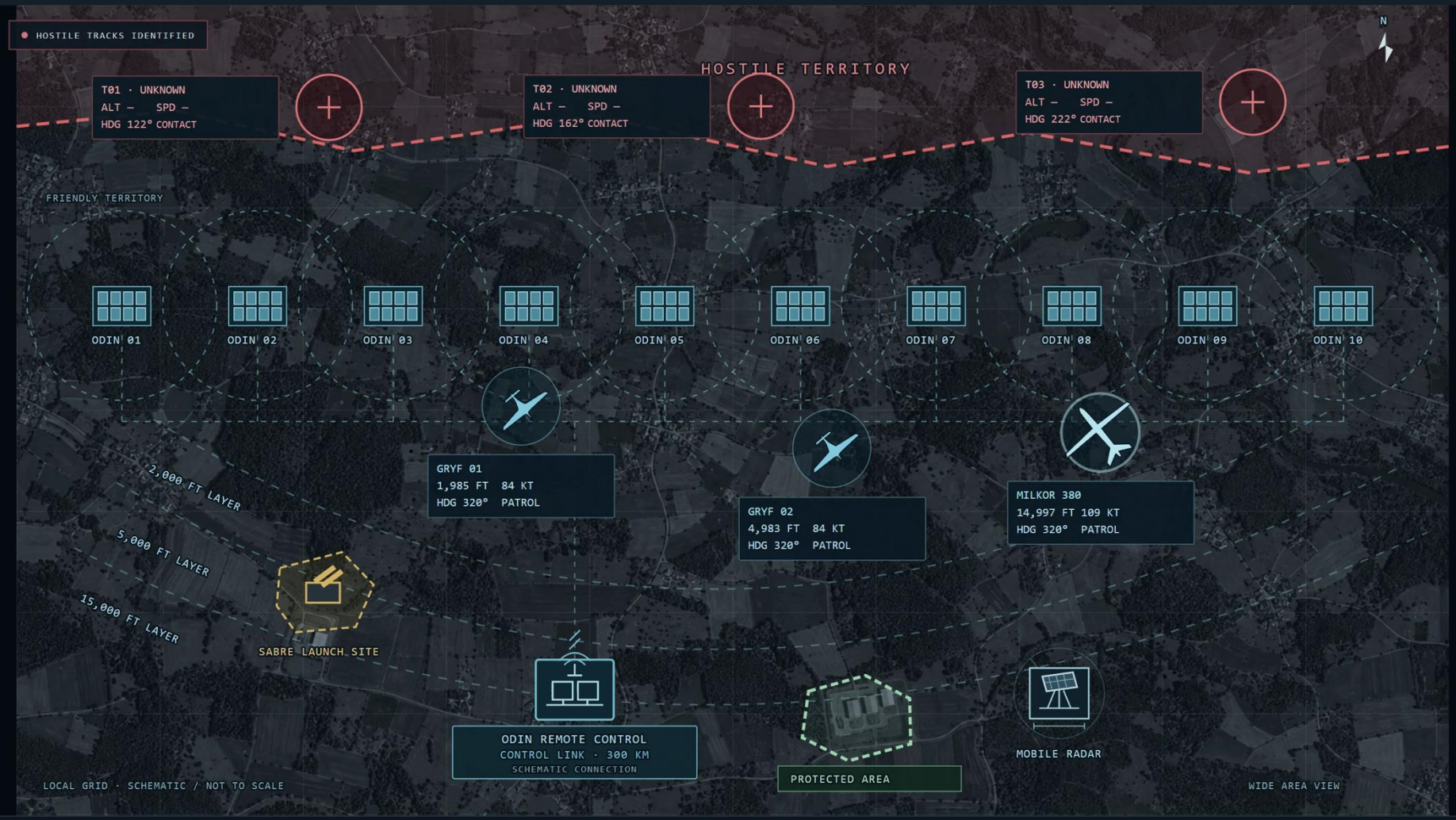
THREAT LEVEL
HOSTILE TRACKS

FRIENDLY TRACKS
03 / 03

DEFENCE NETWORK
10 NESTS ONLINE

- Friendly assets
- Hostile territory
- SABRE base

SCHEMATIC SCENARIO
Simulated data · no live feed



FRIENDLY TRACK MANAGER 3

GRYF 01	FRIEND		
1,985 FT	84 KT	320°	
GRYF 02	FRIEND		
4,983 FT	84 KT	320°	
MILKOR 380	FRIEND		
14,997 FT	109 KT	320°	

SELECTED TRACK

CALLSIGN	MILKOR 380
PAYLOAD	SURVEILLANCE
GRID X / Y	1029 / 405
HEADING	319.6°
RADAR BEARING	9.0°
STATUS	ON STATION

MISSION TRACKS

T01 · UNKNOWN CONTACT
UNCLASSIFIED
CLASSIFICATION PENDING

T02 · UNKNOWN CONTACT
UNCLASSIFIED
CLASSIFICATION PENDING

T03 · UNKNOWN CONTACT
UNCLASSIFIED
CLASSIFICATION PENDING

SYSTEM HEALTH

DATA LINK	NOMINAL
RADAR	ONLINE
TIME SYNC	LOCKED

EVENT LOG SIMULATED

21:00:48Z All three friendly aircraft on station · air picture established
21:00:00Z Ground assets online · protected area / radar / ODIN / SABRE
21:00:00Z GRYF 01 / GRYF 02 inbound east · MILKOR 380 inbound west

SCENARIO 04 / 16
Hostile tracks identified
PAUSED

COMMON OPERATIONAL PICTURE

SECTOR NORTH · LOCAL GRID / TARGETS ASSIGNED

MAP LAYERS

- [x] Territorial boundary
- [x] Protected zones
- [x] Ground assets
- [x] Air tracks
- [x] Track history
- [x] Monochrome imagery

OPERATION STATUS

THREAT LEVEL
HOSTILE TRACKS

FRIENDLY TRACKS
03 / 03

DEFENCE NETWORK
10 NESTS ONLINE

- Friendly assets
- Hostile territory
- SABRE base

SCHEMATIC SCENARIO
Simulated data · no live feed



FRIENDLY TRACK MANAGER 3

GRYF 01			FRIEND
1,987 FT	84 KT	300°	
GRYF 02			FRIEND
5,003 FT	84 KT	300°	
MILKOR 380			FRIEND
15,017 FT	109 KT	300°	

SELECTED TRACK

CALLSIGN	MILKOR 380
PAYLOAD	SURVEILLANCE
GRID X / Y	1018 / 396
HEADING	300.1°
RADAR BEARING	6.1°
STATUS	ASSIGNED

MISSION TRACKS

T01 · GERAN-5
ASSIGNED
10,000 FT · MILKOR 380

T02 · GERAN-4
ASSIGNED
2,500 FT · GRYF 02

T03 · SHAHED-136
ASSIGNED
600 FT · ODIN 09

SYSTEM HEALTH

DATA LINK	NOMINAL
RADAR	ONLINE
TIME SYNC	LOCKED

EVENT LOG SIMULATED

21:00:28Z MILKOR 380 → T01 / GRYF 02 → T02
21:00:28Z T03 SHAHED-136 · 600 FT · all three classified

SCENARIO 05 / 16
Targets assigned
PAUSED

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Offensive Capabilities: Addressing the Source



- Complement interception with action against the source of attacks
- Apply operational experience to mission planning
- Combine complementary capabilities within each mission
- Adapt missions to the target and its protection
- Disrupt the capacity to launch further attacks

COMMON OPERATIONAL PICTURE

SECTOR NORTH · LOCAL GRID / TWO SABRE TRACKS EN ROUTE

MAP LAYERS

- [x] Territorial boundary
- [x] Protected zones
- [x] Ground assets
- [x] Air tracks
- [x] Track history
- [x] Monochrome imagery

OPERATION STATUS

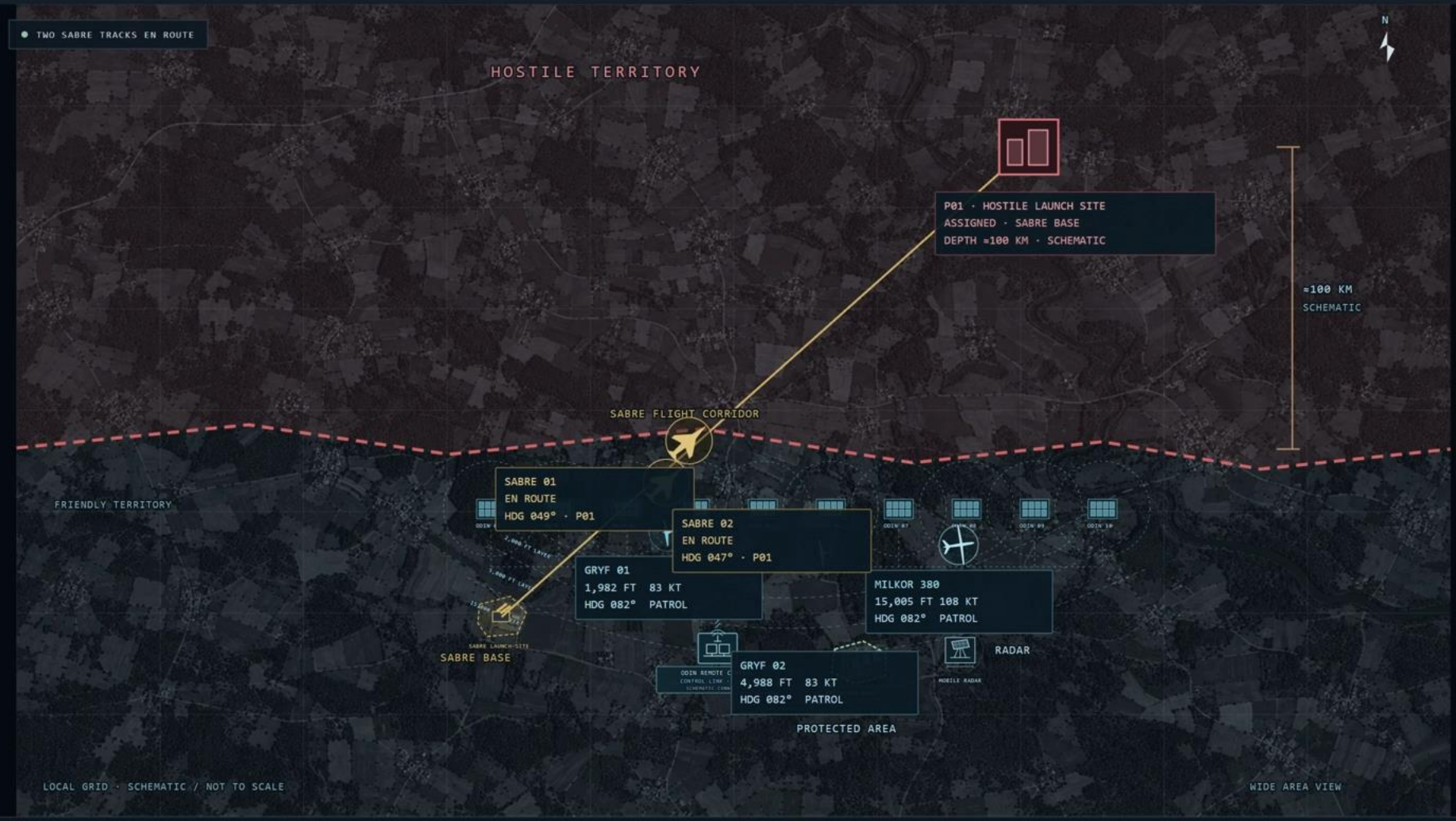
THREAT LEVEL
GROUND TARGET

FRIENDLY TRACKS
03 / 03

DEFENCE NETWORK
10 NESTS ONLINE

- Friendly assets
- Hostile territory
- SABRE base

SCHEMATIC SCENARIO
Simulated data · no live feed



FRIENDLY TRACK MANAGER 3

GRYF 01			FRIEND
1,982 FT		83 KT	082°
GRYF 02			FRIEND
4,988 FT		83 KT	082°
MILKOR 380			FRIEND
15,005 FT		108 KT	082°

SELECTED TRACK

CALLSIGN	MILKOR 380
PAYLOAD	SURVEILLANCE
GRID X / Y	987 / 454
HEADING	81.6°
RADAR BEARING	359.2°
STATUS	ON STATION

MISSION TRACKS

P01 · LAUNCH SITE
ASSIGNED TO SABRE
≈100 KM BEYOND FRONT · SCHEMATIC

SABRE 01
EN ROUTE
ASSIGNED TARGET P01

SABRE 02
EN ROUTE
ASSIGNED TARGET P01

SYSTEM HEALTH

DATA LINK	NOMINAL
RADAR	ONLINE
TIME SYNC	LOCKED

EVENT LOG SIMULATED

21:00:48Z All three friendly aircraft on station · air picture established
21:00:00Z Ground assets online · protected area / radar / ODIN / SABRE
21:00:00Z GRYF 01 / GRYF 02 inbound east · MILKOR 380 inbound west

SCENARIO 13 / 16
Two SABRE tracks en route
PAUSED

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Strengthening allied air defence

01 INTEGRATION

02 COST EFFECTIVENESS

03 INDUSTRIAL SCALE-UP

04 STRATEGIC AUTONOMY